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Total Number of Pages in This Submission

Application Number	10/669,771
Filing Date	24 Sept. 2003
First Named Inventor	Savage et al.
Art Unit	1724
Examiner Name	Cintins, I.
Attorney Docket Number	SERV240STWP-CIP

ENCLOSURES (Check all that apply)

<input type="checkbox"/> Fee Transmittal Form	<input type="checkbox"/> Drawing(s)	<input type="checkbox"/> After Allowance Communication to TC
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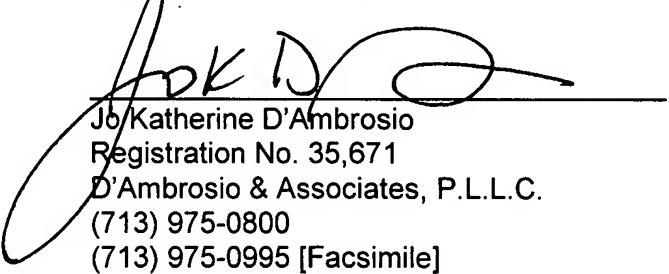
Re: Patent Application Serial No. 10/669,771, Savage, et al., for **PROCESS FOR
DIRECT FILTRATION OF WASTEWATER.**

Dear Sir:

Enclosed are:

- Appellant's Brief (twenty (20) pages),
- Transmittal Form,
- Check in the amount of \$500.00, and
- Postcard as indication of your receipt of the above.

Respectfully submitted,


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BOARD OF PATENT APPEALS AND INTERFERENCES

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: §
Savage et al. §
Serial No.: 10/669,771 § Group Art Unit: 1724
Filed: Sept. 24, 2003 § Examiner: CINTINS, I.
Title: PROCESS FOR DIRECT § Atty. Docket No.: SERV240STWP-CIP
FILTRATION OF § Customer No. 37,334
WASTEWATER §

Board of Patent Appeals and Interferences
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANT'S BRIEF (41 C.F.R. § 41.37)

This brief is in furtherance of the Notice of Appeal, filed in this case on 1 July 2005.

The \$500.00 fee for filing a brief in support of an appeal required under §41.20 is enclosed.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is the assignee, Severn Trent Services Company, as evidenced by the assignment set forth at Reel 016424, Frame 0844.

II. RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal: there are no such appeals or interferences.

III. STATUS OF CLAIMS

The status of the claims in this application is:

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

The total number of claims in the application is twenty-three.

B. STATUS OF ALL THE CLAIMS:

1. Claims pending: 1 - 23.
2. Claims rejected: 1 - 23.

C. CLAIMS ON APPEAL

The claims on appeal are: 1 - 23.

IV. STATUS OF AMENDMENTS

No amendments to the application have been filed subsequent to final rejection. Amendments within Response to the Final Office Action dated 11 January 2005 were rejected by the Examiner in the 10 May 2005 Advisory Action. Claims 1 – 23 stand as originally filed. A copy of the claims at issue is attached as the Appendix of Claims.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention is a process for removal of BOD (Biochemical Oxygen Demand) and suspended solids from a high volume wastewater stream by direct filtration of the wastewater. The process comprises piping high volume, raw, unsettled wastewater directly to a deep bed filter without pretreatment in a facultative zone (*Application, page 5, Lines 12 – 16, Fig. 1, 2 and 3*); filtering the high volume, raw, unsettled wastewater by filtration through the deep bed filter (*Application, page 5, Lines 18 – 20, Fig. 1, 2 and 3*); and backwashing the deep bed filter (*Application, page 5, Lines 25, Fig. 1, 2 and 3*). This process is innovative in that the primary steps of passing wastewater through a clarifying or settling tank to remove solids or through a facultative zone for denitrification are replaced by the feeding of fresh, unsettled wastewater directly to a deep bed filter for aerobic filtration without extensive pretreatment. Further, the wastewater does not require pre-processing by other forms of filtration or screening before being piped to the deep bed filter, although such processing may be used.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. The Examiner has rejected claims 1 – 5, 8 and 15 as unpatentable under 35 U.S.C. §102(b) over U.S. Patent No. 4,128,477 to Nebolsine
2. The Examiner has rejected claims 6, 7, 9 – 14 and 16 – 23 as unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 4,128,477 to Nebolsine, taken in view of the U.S. Patent No. 5,156,738 to Maxson.

VII. ARGUMENTS

REJECTIONS UNDER 35 U.S.C. §102(b)

The Examiner has rejected Claims 1 – 5, 8 and 15 as being clearly anticipated by Nelbosine, stating: "See col. 1, lines 6, 11, and 35; col. 2, line 31; col. 3, line 2; col. 4, lines 2-3, 35-37 and 53-54; col. 6, line 19-21 and 35 – 38; col. 7, lines 10-11, 14, 23-24, 5- 56 and 62; col. 8, lines 21-23; and col. 9, lines 17 –19." Appellants argue that the process of sending raw, unsettled sewage directly to a deep bed filter was not known or utilized before Appellants' invention. Direct filtration of wastewater is novel.

Anticipation requires the presence in a single prior art reference disclosure of each element of the claim under consideration. *W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim, but this is not an *ipsissimis verbis* test, i.e., identity of terminology is not required. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). MPEP 2131.

Applicant's Claim 1:

1. A process for removing BOD and suspended solids from a high volume wastewater stream comprising:

piping high volume, raw, unsettled wastewater directly to a deep bed filter without pretreatment in a facultative zone;

filtering the high volume, raw, unsettled wastewater by filtration through the deep bed filter;

backwashing the deep bed filter.

Nebolsine neither expressly or inherently contains, within its four corners, every element of the claims in question. Specifically, Nebolsine does not disclose a deep bed filter for processing raw, untreated sewage without any prior processing. The Nebolsine method teaches multiple pre-treatments of sewage prior to delivering the sewage to an ultra high rate (or deep bed) filter 9. See '477, col. 5, *lines 11-26 and lines 32-36*. In fact, as Nebolsine specifically points out: "Accordingly, an important aspect of the present invention is to conduct effective narrow screening operations." '477, Col. 5, *lines 24 – 26*.

Narrow screening is the basis for the Nebosine invention. In the '477 patent, Nebolsine states:

The foregoing problems are overcome by the present invention in which heavy debris and relatively dense suspended materials are removed by conducting the effluent steam through bar racks and degritters, subjecting the effluent to narrow-range screening, admixing a coagulant composition with the effluent to promote agglomeration of microscopic suspended solids into particles having an average mean particle size between about 1 and about 70 microns, removing said agglomerated particles from the effluent screen by filtration through an ultra-high rate water filtration apparatus to

produce a filtrate containing from about 50 to about 75 milligrams per liter of suspended solids, introducing oxygen, air or ozone into said filtrate to raise the level of dissolved oxygen and discharging the oxygen treated filtrate to the sea...This procedure overcomes most of the drawbacks of the prior art since it can remove the principal contaminants, including suspended solids, floating particles, settleable solids, grease, oil, heavy metals and turbidity to the same degree as conventional secondary sewage treatment, but at less than half the cost. '477, Col. 2, Lines 28 – 51.

In contrast, the present invention, as claimed in claim 1, directly pipes raw, unsettled wastewater to a deep bed filter, without the prior screening operations such as those required by Nebolsine. As described in Appellants' Summary of the Invention, both the primary steps of passing sewage through a clarifying or settling tank to remove solids or through a facultative zone for denitrification are replaced by the direct feeding of fresh, unsettled sewage directly to a deep bed filter for aerobic filtration. *Application*, page 4, Lines 5 – 8. Further, per Appellants' claim 1, screening prior to piping the wastewater to the deep bed filter is not required; although optionally screening may be used.

As described in the Specification, the direct filtration process means that the suspended solids, soluable BOD and colloidal BOD are removed during filtration. *Application*, page 4, lines 9 – 12. Moreover, in the Detailed Description of Invention the direct filtration process is described as follows:

In the direct filtration process, raw sewage wastewater is piped to a deep bed filter without primary clarification or

secondary aeration. Referring to Figs. 1, 2, and 3, one preferred process 100 for removing BOD and suspended solids from wastewater comprises piping influent 125 comprising raw, unsettled wastewater directly to a deep bed filter 200. The raw, unsettled wastewater 125 is then filtered through an aerobic filtration process in a deep bed filter 200.

Application, page 5, lines 17 - 23.

Claim 1 uses the term "directly." In the Interview Summary dated March 07, 2005, Continuation Sheet-page 3, the Examiner stated,

(t) The examiner pointed out that the "directly" language of claim 1 merely precludes pretreatment in a facultative zone, and does not preclude the screening or chemical mixing treatments of this (Nebosine) reference. *see also, Office Action, dated January 11, 2005, bottom page 3 to top page 4.*

The Examiner has repeatedly attempted to define the term "directly" without regard for Appellant's description and use of the term. During patent examination, the pending claims must be "given" their broadest reasonable interpretation consistent with the specification. *In re Hyatt*, 211 F. 3d 1367, 1372, 54 USPQ 2d. 1664, 1667 (Fed. Cir. 2000); MPEP 2111. When the specification states the meaning that a term in the claim is intended to have, the claim is examined using that meaning, in order to achieve a complete exploration of the applicant's invention and its relation to the prior art. *In re Zletz*, 893 F. 2d 319, 13 USPQ 2d. 1320 (Fed. Cir. 1989); MPEP 2173.05(a). A claim may not be rejected solely because of the type of language used to define the subject matter for which patent protection is sought. *In re Swinehart*, 436 F.2d 210, 160 USPQ 226 (CCPA 1971); MPEP 2173.01.

As indicated above, the Summary of the Invention, page 4, lines 5-8 as well as the Detailed Description of the Invention, page 5, lines 19 to 24, and the drawings define and describe what the term "directly" means. Appellant's use of the term "directly" means that the suspended solids, soluble BOD and colloidal BOD are removed from the raw sewage within the deep bed filter, not before. *Application, page 4, lines 9-12.* As taught in the Background of the Invention, the known treatment of wastewater prior to the instant invention included a primary treatment stage which was a physical process for removing solids and a secondary treatment stage or aerobic biological process. *Application, page 1, lines 21-30.* Nebolsine, consistent with the teachings of his time, discloses the removal of the principle contaminants prior to deep bed filtration, and the necessity of a primary treatment stage, including his novel concept of fine screening of the suspended solids, down to from 1 to 70 microns, prior to the secondary sewage treatment. '477, Col.2, lines 28-51. Appellants teach direct filtration without a primary treatment stage other then optional degritting and optional screening of large solids. Nebolsine, in the '477 patent, requires a primary treatment stage. The '477 patent does not teach direct filtration of wastewater and therefore, does not anticipate Appellant's invention as claimed.

Nebosine does not anticipate the Appellants' deep bed filtering process in that Nebolsine does not contain the novel concept of a direct filtration. Nebolsine does not contain every element recited in the claim and as arranged in the claim. Contrary to the Examiner's statement that all elements are disclosed in the Nebolsine reference, a direct piping of untreated wastewater to a deep bed filter is not disclosed, so the rejection is unsupported by the art and should be withdrawn.

REJECTIONS UNDER 35 U.S.C. §103(a)

The Examiner has rejected Claims 6, 7, 9 – 14, and 16 - 23 as being unpatentable over Nelbosine in view of Maxson (U.S. Patent No. 5, 156, 738), stating: 1. "it would have been obvious to one of ordinary skill in the art at the time the invention was made to back wash the filter of Nebosine in the manner taught by Maxson, since this secondary reference teaches that filter beds are typically backwashed in this manner." and 2. "...it would have been obvious to one of ordinary skill in the art at the time of the invention was made to include an additional air only backwashing treatment after the water backwashing treatment in the thus modified primary reference, as recited in claims 10 and 11, in order to further promote the destruction of BOD components in the sewage undergoing treatment. Such modification is deemed to be especially obvious in view of the disclosure by Nebosine that air may be added to the filtrate from the deep bed filter, in order to increase its level of dissolved oxygen."

a. Failure of Examiner to Establish a *Prima Facie* Case for Obviousness

The Examiner has the burden under 35 U.S.C. §103 of establishing a *prima facie* case of obviousness. The Examiner can satisfy this burden "only by showing some **objective teaching** in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references." emphasis added. *In re Johnson*, 747 F.2d 1456, 223 U.S.P.Q. 1260 (Fed. Cir. 1984); *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q. 2d 1596, 1598 (Fed. Cir. 1988). "To reject

claims in an application under 103, an examiner must show an unrebutted *prima facie* case of obviousness. . . In the absence of a proper *prima facie* case of obviousness, an applicant who complies with the other statutory requirements is entitled to a patent. . ." *In re Rouffet*, 149 F.3d 1350, 1355, 46 USPQ2d 1453, 1455 (Fed. Cir. 1998). Further, and important in the present appeal, the ground for asserting a *prima facie* case of unpatentability cannot be speculative. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993).

Invention as a Whole

To establish a *prima facie* case of obviousness, the Examiner's grounds must meet, *inter alia*, the criteria that: the prior art reference (or references when combined) must teach or suggest all the instant claim limitations. MPEP §706.02(j)). Neither Nebolsine nor Maxson, singly or combined teach the novel elements of the Applicant's invention. The Examiner has not met this basic criteria and has failed to establish a *prima facie* case of obviousness.

Response to Rejection 1.

The Examiner states it would have been obvious to one of ordinary skill in the art at the time the invention was made to backwash the filter of Nebosine in the manner taught by Maxson (air only backwashing followed by water backwashing), since this secondary reference teaches that filter beds are typically backwashed in this manner. Maxson teaches that filter beds are typically backwashed in this manner in Europe. '738, Col. 1, lines 11 – 13.

Neither Nobolsine nor Maxson teach a process for direct filtration of wastewater. Appellants' use of the term "directly" means that the suspended

solids, soluble BOD and colloidal BOD are removed from the raw sewage within the deep bed filter, not before. *Application*, page 4, lines 9-12. Nebolsine teaches the removal of the principle contaminants or a primary treatment stage, including fine screening of the suspended solids, down to from 1 to 70 microns, prior to the secondary sewage treatment. '477, Col.2, lines 28-51. Maxson does not teach or disclose a process for direct filtration. Maxson's patent teaches a method of backwashing. The '738 patent does not discuss primary and secondary stages of wastewater treatment. Neither Nebolsine nor Maxson, singularly or combined, teach Appellant's process for direct filtration as this term is defined by Appellant's specification and claimed in independent claims 1 and 16. Examiner has failed to establish a *prima facie* case of obviousness.

The Examiner further states Maxson teaches the Applicant's flow rates, time duration and frequency, citing col. 1, lines 20 –32. However, these recitations are a generalized background explanation of a backwashing sequence, not a teaching by Maxson to specific flow rates, times or frequencies. The Maxson patent is for an apparatus for distributing gas or liquid in an underdrain lateral system. Maxson never claims any flow rates, time duration and frequency. See Maxson claims, 1 – 20. Even the Maxson example of an underdrain lateral system made in accordance with the invention (col. 9, lines 25 – 62) only uses descriptive flow rates to describe the production of an air plenum. Further, there is no discussion of time duration or frequency in Maxson's example.

Response to Rejection 2:

The Examiner states it would have been obvious to one to: include an additional air only backwashing treatment after the water backwashing treatment in the thus modified primary reference...in order to promote the destruction of BOD components in the sewage undergoing treatment. Such modification is deemed to be especially obvious in view of the disclosure by Nebolsine that air may be added to the filtrate from the deep bed filter, in order to increase its level of dissolved oxygen. *Office Action, 13 July 2004, p. 3.*

Nebolsine adds air to the filtrate "In order to raise the level of dissolved oxygen in the filtrate prior to its introduction to the sea" by treating the filtrate with atomized air within the confines of the outfall pipe. In the Nebolsine process, air is not added in the deep bed filter. Nor is Nebolsine concerned with maximizing the destruction of BOD components in the discharge:

One of the basic aims of sewage treatment had always been to limit the concentration of BOD (i.e. compositions which have a Biochemical Oxygen Demand) so as not to excessively deplete the dissolved oxygen in the receiving water body. However, due to the different ecological conditions encountered in confined fresh water bodies and the open sea, it is not necessary to adopt the same stringent BOD concentration limits for discharges to the sea and higher levels can be tolerated. '477, Col. 8, lines 31- 39.

In contrast, the use of air backwashing in Maxson is for filter cleaning purposes, and it would not have been obvious to backwash the filter bed of

Nebolsine in the manner of Maxson. Nebolsine's purpose of the addition of air is to increase the level of dissolved oxygen in the filtrate discharged into seawater to ensure that marine species in the area of the discharge will not be adversely affected, despite the presence of any remaining BOD constituents. '477, Col. 9, lines 19 – 24. Nebolsine is not concerned with further destruction of DOB material before discharge by cleaning the deep bed, but only increasing dissolved oxygen to the filtrate for prevention of shock to marine life residing in the area where the treated filtrate is discharged.

The Examiner has not shown some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references.

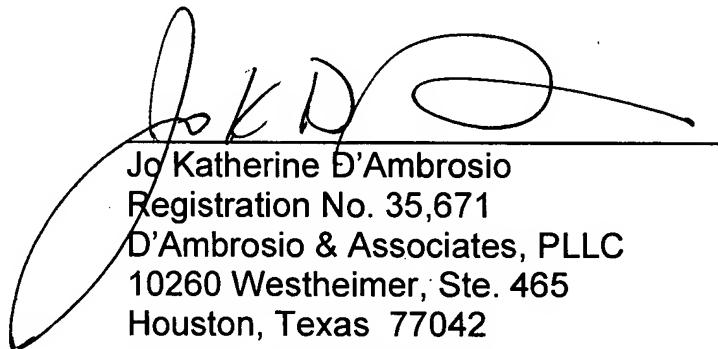
The Examiner speculates with generalized statements that the secondary reference, Maxson, when combined with the primary reference, Nebolsine, teaches or suggests all the instant claim limitations. Neither Nebolsine nor Maxson, alone or combined as suggested by the examiner, teach Applicant's direct filtration process. Moreover, Maxson does not teach the Applicant's flow rates, time duration and frequency. Nor does Nebolsine use the injection of air for cleaning purposes, or even suggest a need for an air backwash. The Examiner's grounds have not met, *inter alia*, the criteria that: the prior art reference (or references when combined) must teach or suggest all the instant claim limitations.

CONCLUSION

It is respectfully submitted that the art of record does not render anticipated or obvious the Applicant's claims. Accordingly, it is respectfully requested that the Examiner's rejection of claims 1 – 23 be reversed.

The text of claims 1 – 23 on appeal are set forth as an attached appendix.

Respectfully submitted,



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August 23, 2005

VIII. CLAIMS APPENDIX

The text of the claims involved in the appeal follows:

1. A process for removing BOD and suspended solids from a high volume wastewater stream comprising:
 - piping high volume, raw, unsettled wastewater directly to a deep bed filter without pretreatment in a facultative zone;
 - filtering the high volume, raw, unsettled wastewater by filtration through the deep bed filter;
 - backwashing the deep bed filter.
2. The process of claim 1 wherein the raw, unsettled wastewater is screened prior to piping to the deep bed filter.
3. The process of claim 1 wherein grit is removed prior to piping the raw, unsettled sewage wastewater to the deep bed filter.
4. The process of claim 1 wherein the raw unsettled wastewater is diluted prior to filtration.
5. The process of claim 1 wherein the backwash is an air/water backwash.
6. The process of claim 5 wherein the rate of air backwash is within a range of between approximately 1 cfm/sq.ft to 10 cfm/sq.ft.
7. The process of claim 5 wherein the rate of air backwash is approximately 6 cfm/sq.ft.

8. The process of claim 5 comprising the additional step of turning on the air backwash so that the filter is bio-conditioned for aerobic activity.
9. The process of claim 5 comprising the additional step of turning on the air backwash before turning on the water backwash so that the filter is bio-conditioned for aerobic activity.
10. The process of claim 5 comprising the additional step of allowing the air backwash to continue after the water backwash is turned off so that the filter is bio-conditioned for aerobic activity.
11. The process of claim 5 comprising the additional steps of turning on the air backwash before turning on the water backwash and allowing the air backwash to continue after the water backwash is turned off so that the filter is bio-conditioned for aerobic activity.
12. The process of claim 5 wherein the rate of water backwash is within a range of between approximately 3 gpm/sq.ft to 35 gpm/sq.ft.
13. The process of claim 5 wherein the rate of water backwash is approximately 6 gpm/sq.ft. to approximately 8 gpm/sq.ft.
14. The process of claim 5 wherein the length of time of the backwash is within a range of approximately 3 minutes to approximately 40 minutes.
15. The process of claim 1 further comprising the step of adding biological floc.

16. A process for removing BOD and suspended solids from a high volume wastewater stream without passing through a primary clarifier or secondary aeration tank, the process comprising:

piping the high volume, raw sewage wastewater stream comprising soluble BOD, insoluble BOD and suspended solids directly to a deep bed granular filter comprising a filtration zone but no facultative zone, the deep bed filter further comprising bed depths within a range of approximately 2.0 ft to approximately 10.0 ft.

filtering the raw sewage wastewater by filtration through the deep bed filter, the filter media comprising granular media with a size range between approximately 2.0 mm to 10.0 mm;

backwashing the deep bed filter at least one time every 48 hours.

17. The process of claims 16 wherein the backwash is an air/water backwash.

18. The process of claim 16 wherein the rate of water backwash is within a range of between approximately 2.5 gpmm/sq.ft to 25 gpm/sq.ft.

19. The process of claim 16 wherein the rate of air backwash is within a range of between approximately 2 cfm/sq.ft to 8 cfm/sq.ft

20. The process of claim 16 wherein the time of the backwash run is within a range of approximately 3 minutes to approximately 40 minutes.

21. The process of claim 16 wherein the bed depth is within a range of approximately 4 ft to approximately 6 ft.

22. The process of claim 16 wherein the effective size of the granular media is within a range of approximately 2.0mm to 6.0mm.
23. The process of claim 16 wherein the filtration rate is within a range of between approximately 2 gpm/sq.ft. and approximately 10 gpm/sq.ft.

IX. EVIDENCE APPENDIX

None

X. RELATED PROCEEDINGS APPENDIX

None